Report as of FY2008 for 2007OR80B: "Campus and Community Monitoring and Restoration of Mill Creek/Shelton Ditch"

Publications

Project 2007OR80B has resulted in no reported publications as of FY2008.

Report Follows

Campus and Community Monitoring and Restoration of Mill Creek/Shelton Ditch, Salem, Oregon

Oregon State University
Institute for Water and Watersheds
2007 Small Grants Program

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Project Description

Mill Creek flows westward from the forested foothills of the Cascade Mountains in central Oregon to the Willamette River in Salem. The 55-square mile watershed drains surface and ground waters from lands used for intensive agriculture, light industry as well as urban development. Like much of Oregon's Willamette Valley, the Mill Creek watershed has experienced reduced water quality conditions. The loss of wetlands, reduced native upland vegetation, compromised riparian buffers and polluted runoff and sedimentation in the Mill Creek watershed have contributed to declining water quality. Additionally, historical diversions and channelization projects for energy generation and timely transportation of peak winter flows to receiving streams have significantly diminished the ecosystem services provided by Mill Creek, and also reduced its aesthetic and recreational value. By emphasizing water quality monitoring and community-based ecological restoration of Mill Creek within the Salem Urban Growth Boundary (UGB), the this project had four main objectives:

- establish a long-term water quality monitoring program facilitating watershed enhancement;
- educate residents and students of all ages residing in the watershed regarding the ecological and social significance of Mill Creek and enlist their help in its restoration;
- facilitate practical partnerships amongst watershed stakeholders, including local businesses, a nascent watershed group, a neighborhood association, a public elementary school, and a private, liberal arts university;
- involve students in practical research, monitoring, and restoration exercises advancing their scientific understanding and policy knowledge.

Despite several setbacks, we are pleased to report that during the two years of the project we have made significant strides towards accomplishing the aforementioned objectives, and have established lasting ongoing relationships with community and campus partners such that we anticipate continuing with this project for several years to come.

Activities

The following provides a brief summary of activities related to each of the five primary objectives.

Establish a long-term water quality monitoring program facilitating watershed enhancement.

During Year 1 of the grant, one OSU graduate student, Adam Stebbins, and two Willamette Undergraduate students, Lukas Strandberg and Lucas Nebert, worked with the PI and co-PIs on establishing monitoring protocols for the Mill Creek and its tributaries and branches.

- **Adam Stebbins**, a Masters in Environmental Science student from Oregon State University
    - consulted with state agencies regarding monitoring protocols appropriate for modeling watershed health;
    - created, tested, and documented a Benthic Macroinvertebrate Sampling protocol useable by project personnel and easily adapted for secondary school as well as university lab application and use. This protocol was based upon consultations with ODFW and DEQ personnel, and in line with state standards so that the information could possibly be used for state purposes;
    - created an accompanying training video for the sampling protocol for use by classes and citizen groups involved in the monitoring process;
    - negotiated access to permanent sampling sites used by the City of Salem;
    - supervised and assisted Strandberg and Nebert in their water quality monitoring and research.
- **Lukas Strandberg and Lucas Nebert** completed supervised thesis projects on the Mill Creek in conjunction with the grant. Both projects involve development of long-term water quality baseline data and testing protocols.
    - Lukas Strandberg completed a thesis project examining the water quality of the Mill Race, a diversion of Mill Creek historically used for power generation and now maintained for aesthetic purposes. Strandberg tested for seven different water quality parameters throughout the race before, during, and after rain events. He also collected information regarding all point and non-point sources of run-off to the race. This information will be extremely useful for future grant projects.
    - Lucas Nebert developed and tested a microbial water quality protocol to be used on Mill Creek by university classes, which can then be scaled down for use by local high school classes. In addition to providing more water quality data at a finer scale, this project will advance our educational outreach opportunities.

In Year 2 of the grant (2008-2009), two Willamette undergraduates, Jeff Bennett and Andrew Wentworth, working with Willamette faculty, began ongoing water quality projects on Mill Creek and its tributaries.

- As part of an assignment in ENVR 327, **Jeff Bennett** began examining 10 years of existing water quality data from permanent monitoring stations along Mill Creek between Hawthorne Avenue and Front Street. Working with City of Salem public works and stormwater management personnel, Jeff focused primarily on *e coli* and nutrient levels in this highly urbanized stretch of Mill Creek. Jeff will continue this work for his senior thesis during the 2009- 2010 academic year. His research will be used by the City of Salem to address implementation and enforcement of TMDLs in this urbanized stretch.
- Working with City of Salem personnel and a local neighborhood organization as an intern, **Andrew Wentworth** has been engaged in developing a site plan for storm water retention, flood mitigation, wetland restoration, and water quality enhancement on 35 acres recently purchased by the city on Battle Creek, a southern, suburban tributary of Mill Creek. The project is the first of its kind in Salem, and has been the subject of much political controversy, as the site was previously targeted for development. The work is ongoing.

Educate residents and students of all ages residing in the watershed regarding the ecological and social significance of Mill Creek and enlist their help in its restoration, creating social capital.

This has been probably the objective of greatest focus during the last two years, and remains the primary motivation for many of our activities (please also refer to section 4 below).

During Year 1, **Adam Stebbins** took the lead on community engagement, by planning, organizing, and leading a "Mill Creek Community Watershed Summit" involving local agencies and attracting residents from throughout the watershed.

During Year 2, the PIs and co-PIs have worked with local stakeholders and the City to promote the absorption of the dysfunctional Mill Creek Watershed Council into a larger, OWEB approved entity representing two other Salem subwatersheds.

Facilitate practical partnerships amongst watershed stakeholders, including local businesses, a nascent watershed group, a neighborhood association, a public elementary school, and a private, liberal arts university.

Thanks in large part to the early efforts of Adam Stebbins working with state, city, county, watershed, neighborhood association, and SWCD personnel, some long standing relationships and partnerships have developed around the Mill Creek project. Of particular importance is the blossoming of a relationship between the City of Salem and Willamette University personnel and departments regarding restoration and monitoring activities in sections of Mill Creek within the Urban Growth Boundary. During this past academic year 2008-2009 the City of Salem storm water management and public works personnel have worked with the co-PIs to establish a series of projects along Mill Creek focusing on water quality. The projects will provide a unique opportunity for Willamette University students.

Involve students in practical research, monitoring, and restoration exercises advancing their scientific understanding and policy knowledge.

The project has been a great boon to Willamette students, as the watershed has become a conscious target of research, teaching, and community service activities.

- During the life of the grant many individual courses have been reformulated with the grant and project in mind:

    - ENVR 105 Introduction to Environmental Science (Professor Kimberlee Chambers' sections) has used Mill Creek to study community water quality and environmental justice issues. The two sets of 32 students also removed invasive species for three hours.
    - ENVR 105 Introduction to Environmental Science (Professor Karen Arabas' and Pike's sections) used Mill Creek to study community water quality and environmental justice issues. More than 60 students also removed invasive species for three hours.
    - ENVR 333 Biogeography (Professor Karen Arabas) used Mill Creek for four dedicated labs, identifying native riparian plants, sampling riparian soils, surveying stream bank, and designing a native planting program.
    - POLI 304 Politics of Environmental Ethics (Professor Joe Bowersox) has used Mill Creek to examine the theoretical and practical connections between ecological and community restoration, with special regard to questions of citizen participation in restoration and monitoring activities. 27 students also participated in invasive species removal.
    - POLI 341 Environmental Policymaking (Professor Joe Bowersox) used Mill Creek for three dedicated labs, examining stream channels, urban run-off, and producing baseline GIS layers for topography, vegetation, and riparian landownership. 13 students also participated in invasive species removal.

Community Service Learning activities

In addition to the above curricular activities, Mill Creek has been a featured "community service learning" site for Willamette activities. Over 35 sections (some 410 students) of first year students gave at minimum 3 hours of service on Mill Creek, removing invasive species, picking up trash, and marking storm drains in 2007, while another 115 students did the same in 2008. Additional sections of other courses also participated in Mill Creek based service learning activities, though no numbers are available for these activities (see "challenges" below).

The Future

As we consider the continuation of the project through self –funding and other potential external sources, we anticipate continuing to focus most of our attention on those areas of

Mill Creek within the Salem city limits, with specific attention upon those areas in proximity to Willamette University. These include the following activities:

- Ongoing water quality monitoring by University classes, as we build up a database for analysis, and expand our testing.
- Continued removal of invasive plants from riparian areas by students and community members;
- In conjunction with city personnel and neighborhood associations, development of series of priority areas for native plant restoration;
- Planting in priority areas;
- In conjunction with the Southeast Salem Neighborhood Association, city personnel, and the University, redesign of the riparian area along Mill Creek/Shelton Ditch between 12th street and 17th street to favor community use.
- Engagement with OWEB regarding the future of the Mill Creek Watershed Council.